

# LH530800A

CMOS 1M (128K × 8) Mask-Programmable ROM

## FEATURES

- 131,072 × 8 bit organization
- Access time: 150 ns (MAX.)
- Power consumption:  
Operating: 193 mW (MAX.)  
Standby: 550  $\mu$ W (MAX.)
- Fully-static operation
- TTL compatible I/O
- Three-state outputs
- Single +5 V power supply
- Packages:  
32-pin, 600-mil DIP  
32-pin, 525-mil SOP  
44-pin, 10 × 10 mm<sup>2</sup> QFP
- JEDEC standard EPROM pinout (DIP)

## DESCRIPTION

The LH530800A is a mask-programmable ROM organized as 131,072 × 8 bits (1,048,576 bits). It is fabricated using silicon-gate CMOS process technology.

## PIN CONNECTIONS

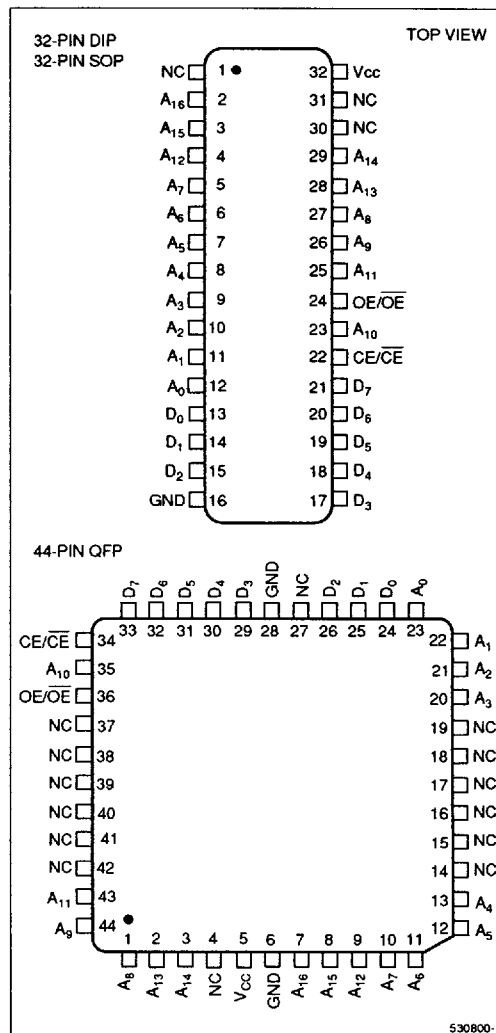
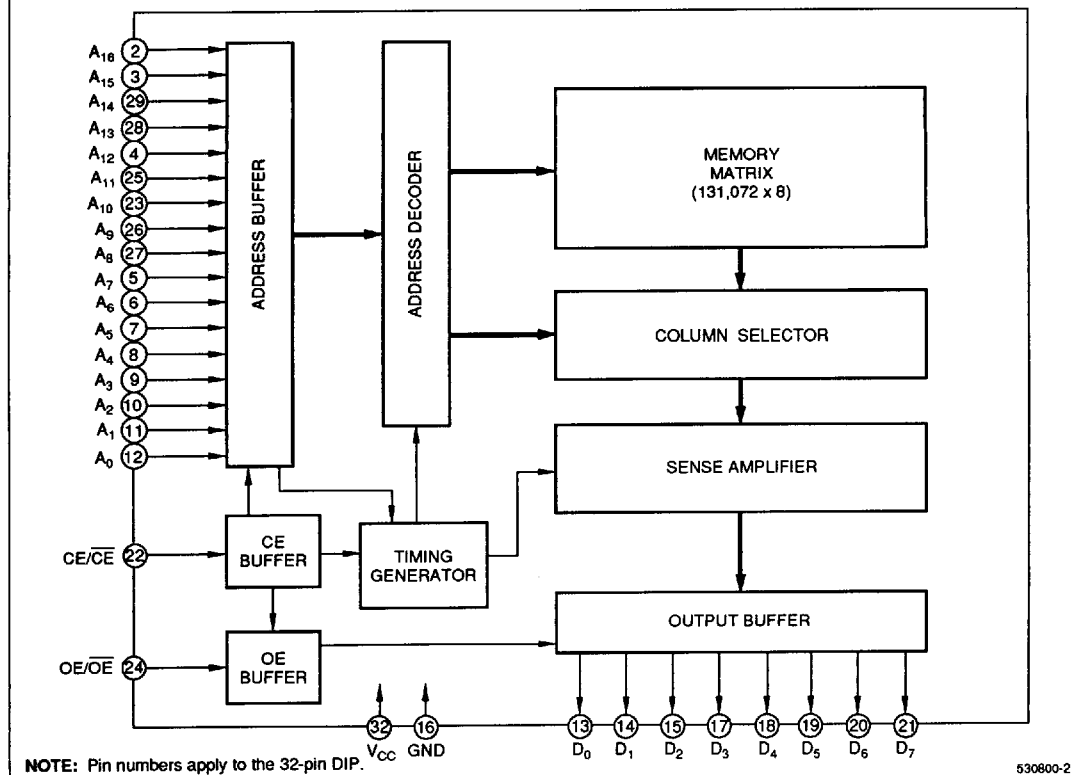


Figure 1. Pin Connections for DIP, SOP, and QFP Packages

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530800-2

Figure 2. LH530800A Block Diagram

## PIN DESCRIPTION

| SIGNAL                           | PIN NAME          | NOTE |
|----------------------------------|-------------------|------|
| A <sub>0</sub> - A <sub>16</sub> | Address input     |      |
| D <sub>0</sub> - D <sub>7</sub>  | Data Output       |      |
| CE/CE                            | Chip enable input | 1    |

| SIGNAL          | PIN NAME            | NOTE |
|-----------------|---------------------|------|
| OE/OE           | Output enable input | 1    |
| V <sub>cc</sub> | Power supply (+5 V) |      |
| GND             | Ground              |      |

## NOTE:

1. Active levels of CE/CE and OE/OE are mask-programmable.

## TRUTH TABLE

| CE/CE | OE/OE | MODE         | D <sub>0</sub> - D <sub>7</sub> | SUPPLY CURRENT               | NOTE |
|-------|-------|--------------|---------------------------------|------------------------------|------|
| L/H   | X     | Non selected | High-Z                          | Standby (I <sub>SB</sub> )   | 1    |
| H/L   | L/H   | Non selected | High-Z                          | Operating (I <sub>CC</sub> ) |      |
| H/L   | H/L   | Selected     | DOUT                            | Operating (I <sub>CC</sub> ) |      |

## NOTE:

1. X = H or L

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## ABSOLUTE MAXIMUM RATINGS

| PARAMETER             | SYMBOL    | RATING                 | UNIT | NOTE |
|-----------------------|-----------|------------------------|------|------|
| Supply voltage        | $V_{CC}$  | -0.3 to +7.0           | V    | 1    |
| Input voltage         | $V_{IH}$  | -0.3 to $V_{CC} + 0.3$ | V    |      |
| Output voltage        | $V_{OH}$  | -0.3 to $V_{CC} + 0.3$ | V    |      |
| Operating temperature | $T_{opr}$ | 0 to +70               | °C   |      |
| Storage temperature   | $T_{stg}$ | -55 to +150            | °C   |      |

## NOTE:

1. The maximum applicable voltage on any pin with respect to GND.

RECOMMENDED OPERATING CONDITIONS ( $T_A = 0$  to +70°C)

| PARAMETER      | SYMBOL   | MIN. | TYP. | MAX. | UNIT |
|----------------|----------|------|------|------|------|
| Supply voltage | $V_{CC}$ | 4.5  | 5.0  | 5.5  | V    |

DC CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $T_A = 0$  to +70°C)

| PARAMETER              | SYMBOL     | CONDITIONS                                                      | MIN. | TYP. | MAX.           | UNIT          | NOTE |
|------------------------|------------|-----------------------------------------------------------------|------|------|----------------|---------------|------|
| Input 'Low' voltage    | $V_{IL}$   |                                                                 | -0.3 |      | 0.8            | V             |      |
| Input 'High' voltage   | $V_{IH}$   |                                                                 | 2.2  |      | $V_{CC} + 0.3$ | V             |      |
| Output 'Low' voltage   | $V_{OL}$   | $I_{OL} = 1.6\text{ mA}$                                        |      |      | 0.4            | V             |      |
| Output 'High' voltage  | $V_{OH}$   | $I_{OH} = -400\text{ }\mu\text{A}$                              | 2.4  |      |                | V             |      |
| Input leakage current  | $ I_{LI} $ | $V_{IN} = 0\text{ V to }V_{CC}$                                 |      |      | 10             | $\mu\text{A}$ |      |
| Output leakage current | $ I_{LO} $ | $V_{OUT} = 0\text{ V to }V_{CC}$                                |      |      | 10             | $\mu\text{A}$ | 1    |
| Operating current      | $I_{CC1}$  | $t_{RC} = 150\text{ ns}$                                        |      |      | 35             | mA            | 2    |
|                        | $I_{CC2}$  | $t_{RC} = 1\text{ }\mu\text{s}$                                 |      |      | 25             |               |      |
|                        | $I_{CC3}$  | $t_{RC} = 150\text{ ns}$                                        |      |      | 30             | mA            | 3    |
|                        | $I_{CC4}$  | $t_{RC} = 1\text{ }\mu\text{s}$                                 |      |      | 20             |               |      |
| Standby current        | $I_{SB1}$  | $\overline{CE} = V_{IL}, \overline{OE} = V_{IH}$                |      |      | 2              | mA            |      |
|                        | $I_{SB2}$  | $\overline{CE} = V_{CC} - 0.2\text{ V},$<br>$CE = 0.2\text{ V}$ |      |      | 100            | $\mu\text{A}$ |      |

## NOTES:

1.  $\overline{CE}/\overline{OE} = V_{IH}$  or  $CE/OE = V_{IL}$
2.  $V_{IN} = V_{IH}/V_{IL}$ ,  $\overline{CE} = V_{IL}$ ,  $CE = V_{IH}$ , outputs open
3.  $V_{IN} = (V_{CC} - 0.2\text{ V})$  or  $0.2\text{ V}$ ,  $\overline{CE} = 0.2\text{ V}$ ,  $CE = V_{CC} - 0.2\text{ V}$ , outputs open

AC CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $T_A = 0$  to +70°C)

| PARAMETER              | SYMBOL    | MIN. | TYP. | MAX. | UNIT | NOTE |
|------------------------|-----------|------|------|------|------|------|
| Read cycle time        | $t_{RC}$  | 150  |      |      | ns   |      |
| Address access time    | $t_{AA}$  |      |      | 150  | ns   |      |
| Chip enable time       | $t_{ACE}$ |      |      | 150  | ns   |      |
| Output enable time     | $t_{OE}$  | 10   |      | 80   | ns   |      |
| Output hold time       | $t_{OH}$  | 5    |      |      | ns   |      |
| CE to output in High-Z | $t_{CHZ}$ |      |      | 70   | ns   | 1    |
| OE to output in High-Z | $t_{OHZ}$ |      |      | 70   | ns   |      |

## NOTE:

1. This is the time required for the output to become high-impedance.

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## AC TEST CONDITIONS

| PARAMETER               | RATING          |
|-------------------------|-----------------|
| Input voltage amplitude | 0.6 V to 2.4 V  |
| Input rise/fall time    | 10 ns           |
| Input reference level   | 1.5 V           |
| Output reference level  | 0.8 V and 2.2 V |
| Output load condition   | 1TTL +100 pF    |

CAPACITANCE ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $f = 1\text{ MHz}$ ,  $T_A = 25^\circ\text{C}$ )

| PARAMETER          | SYMBOL    | MIN. | TYP. | MAX. | UNIT |
|--------------------|-----------|------|------|------|------|
| Input capacitance  | $C_{IN}$  |      |      | 10   | pF   |
| Output capacitance | $C_{OUT}$ |      |      | 10   | pF   |

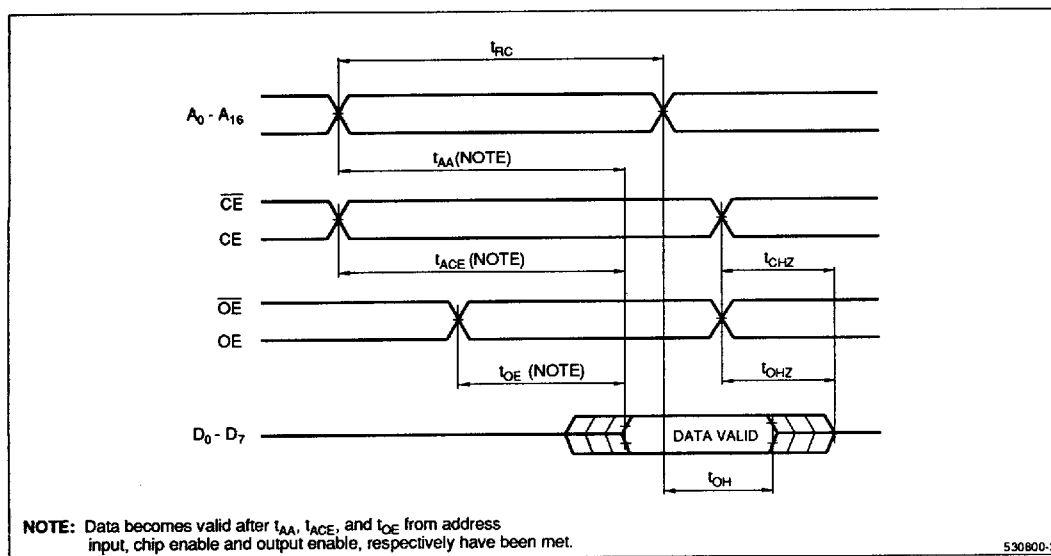


Figure 3. Timing Diagram

## ORDERING INFORMATION

| LH530800A<br>Device Type                                                                              | X<br>Package | - ##<br>Speed |                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------|--------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                       |              | 15 150        | Access Time (ns)                                                                                                                     |
|                                                                                                       |              |               | { D 32-pin, 600-mil DIP (DIP32-P-600)<br>M 44-pin, 10 x 10 mm <sup>2</sup> QFP (QFP44-P-1010)<br>N 32-pin, 525-mil SOP (SOP32-P-525) |
|                                                                                                       |              |               | CMOS 1M (128K × 8) Mask Programmable ROM                                                                                             |
| <b>Example:</b> LH530800AD-15 (CMOS 1M (128K × 8) Mask Programmable ROM, 150 ns, 32-pin, 600-mil DIP) |              |               |                                                                                                                                      |

530800-6